

Patent Claims

1. A method of making porous near-net-shape metallic and/or ceramic parts with an open porosity of at least 10% by volume according to the steps of:

5 a) forming an injectable mass of metallic and/or ceramic powder, at least one thermoplastic binder, and at least one place holder;

b) injection molding the mass into the shape of the part to be produced;

10 c) cooling the injection-molded mass and setting it in a capillary-active material and subjecting it to a first-stage binder removal to produce an open porosity;

d) removing the place holder at least partially from the part with a fluid;

15 e) subjecting the part to a thermal binder-removing process;

f) subsequently sintering the part.

2. The method according to claim 1 wherein the place holder is NaCl, KCl, K_2CO_3 , or Na_2CO_3 .

20 3. The method according to claim 1 or 2 wherein the metal powder is stainless steel, Ti, NiTi, or a titanium alloy.

4. The method according to claims 1 to 3 wherein between steps c) and d) there is a thermal binder-removing step.

5. The method according to claim 4 wherein the thermal binder-removing step is conducted at a temperature up to 270°C under a protective-gas atmosphere.

6. The method according to claims 1 to 5 wherein the starting powder has a particle size of less than 20 µm.

7. The method according to claims 1 to 6 wherein the thermal binder-removing step is conducted at a temperature up to 500°C and under a protective-gas atmosphere.

8. The method according to claims 2 to 7 wherein a fluid heated up to 50°C is used.

9. The method according to claims 1 to 8 wherein the fluid for removing the place holder is water.

10. The method according to claim 1 wherein a stirred water bath is used in order to remove the place holder.

11. The method according to claims 1 to 10 wherein the thermal binder-removing step uses argon as a protective gas.

12. The method according to claims 1 to 11 wherein an open porosity in the part is produced of at least 30% by volume, in particular 50% by volume.